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The Canadian Botanical Association Bulletin

Bulletin de l'Association Botanique du Canada

September / Septembre 2007 • Volume 40 No 2 / N°2



Dr. Christian Lacroix. Photo: C Maxwell

Chers membres,

Le début d'une nouvelle année académique s'annonce avec l'arrivée de nouveaux visages dans nos salles de classe et dans nos labos. N'hésitez pas à encourager vos étudiant(e)s (premier cycle, gradués, et postdocs) à devenir membre de l'ABC ou encore mieux, parrainez leur première incription! Nous devrions tous nous fixer l'objectif de parrainer au moins un nouveau Membre en 2008. Nous pourrions ainsi doubler nos nombres !La planification du congrès à Vancouver en 2008 avec nos collègues américains a déjà commencé. Le comité organisateur mènera bientôt une visite du site pour évaluer les services offerts par l'université. Merci à l'avance à Santokh Singh, notre vice-président et son équipe croissante de volontaires pour représenter les intérêts de l'ABC.

Meilleurs voeux

Christian Lacroix, Président.

Dear members,

With the beginning of a new academic year come new faces in our classes and labs. Please encourage your new students (undergraduates, graduates and postdocs) to become a member of CBA or better yet, sponsor their first registration! Each of us should set a goal to sponsor at least one new member in 2008. This would double our numbers !

Planning for the 2008 meeting in Vancouver with our American colleagues has already begun. The organizing committee will soon be conducting a site visit to assess the services provided by the university. Thank you very much in advance to Santokh Singh, our Vice-President, and his growing team of volunteers for advocating on CBA's behalf.

Best wishes,

Christian Lacroix, President.

Canadian Botanical Association Bulletin

The CBA Bulletin is issued three times a year (in theory in March, September and December) and is available to all CBA members in electronic format or for an additional fee, in hard copy.

Information for submitting texts
All members are welcome to submit texts in the form of papers, reviews, comments, essays, requests, or anything related to botany or botanists. Any medium is acceptable for submission but electronic documents are likely to speed up the publication. For detailed directives on text submission please contact the Editor (see below). For general information about theCBA, go to the web site: http://www.cba-abc.ca

Association botanique du Canada Bulletin

Le Bulletin de l'ABC paraît trois fois par année, normalement en mars, septembre et décembre. Il est envoyé à tous les membres de l'ABC.

Soumission de textes
Tous les membres de l'Association sont invités à envoyer des textes de toute natureconcernant la botanique et les botanistes (articles, revues de publication, commentaires,requêtes, essais, etc.). Tous les supports de texte sont acceptés. L'utilisation de documents électroniques peut accélérer la publication.Pour des renseignements détaillés sur la soumission de textes, veuillez consulter le rédacteur (voir ci-dessous) . Infos générales sur l'ABC à l'url suivant: http://www.cba-abc.ca

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Next issue / Prochain numéro
Texts for the next issue, 40(**3**), must be received before **November 15th 2007**

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Association News

ANNUAL REPORT FOR CANADIAN JOURNAL OF BOTANY
(July, 2006-June, 2007) Barry J. Shelp and R. Larry Peterson FRSC. Co-editors.

1. Changes to Editorial Board:
   Completion of term as Associate Editor: John Lott, Pam Krannitz
   Associate Editors Appointed: Peter Ryser
2. Theme Papers Published:
   Papers from Shoot meristem symposium held at Plant Canada (2005), Guest Editors: Nancy Dengler and Bill Remphrey
3. Special Issues In Progress:
   Populus research, Guest Editors: Janice Cooke and Stewart Rood
   Systematics research in Canada, Guest editors: Anne Bruneau, Sean Graham
4. Theme papers In Progress:
   Papers from *Vitis* symposium held at the International Botanical Congress (2005), Guest Editors: Jean Gerrath and Usher Posluszny
   Papers from Ethnobotany symposium, Canadian Botanical Association meeting (June, 2006), Guest Editors: John Arnason and Alain Cuerrier
5. Invited Reviews Published:
   Canadian Botanical Association Lawson Medal Winner: 2005: Denis Barabé
   Canadian Society of Plant Physiologists C.D. Nelson Award Winner (2006) Greg Moorhead
   Plenary Session, Plants, Canada and Climate Change, Plant Canada (2005) McKeown, Warland, McDonald

6. Reviews/Minireviews/Commentaries Published: = 9
7. Reviews/Minireviews in progress = 4
8. General Information:
   New journal cover design
   Name change to Botany/Botanique with byline “An International Journal for Plant Biology: to occur in January 2008 (See Page 31)
   First prize to be awarded in 2007 for most cited paper
   Average time from submission to press (Jan. to Sept. 2006 data = 154 days (E- version) 172.8 days (Paper version)

TABLE 1. GENERAL INFORMATION ON MANUSCRIPTS SUBMITTED

Category	Calendar year				
	2002	2003	2004	2005	2006
No. manuscripts handled	214	326	372	424	405
No. manuscripts accepted	118	162	172	173	149
No. manuscripts rejected or withdrawn	96	164	202	251	256
% rejected or withdrawn	45	50	54	59	63
Impact factor	0.885	0.948	1.194	1.058	

TABLE 2. MANUSCRIPTS PUBLISHED BY CATEGORY (July–June)

Category	Number of manuscripts			% Distribution		
	2004-05	2005-06	2006-07	2004-05	2005-06	2006-7
Cell & Molecular Biology	3	25	4	2	12	3
Ecology	50	55	45	31	27	32
Mycology and plant-microbe interactions	48	29	30	30	14	21
Paleobotany	6	5	4	4	2.5	3
Physiology & Biochemistry	14	42	17	8.5	21	12
Structure & Development	23	16	18	14	8	13
Genetics	7	13	8	4	6	6
Systematics	9	18	13	6	9	9
Phycology	1	1	2	.5	.5	1
TOTAL	161	204	141			

Canadian Journal of Botany to be renamed "Botany"

NRC Research Press is pleased to announce that, beginning January 2008, the Canadian Journal of Botany will be changing its name to Botany.
This name change will solidify the journal's position as an international journal for plant biology.

Published since 1929, this monthly journal features comprehensive research articles and notes in all segments of plant sciences, including cell and molecular biology, ecology, genetics, mycology and plant-microbe interactions, paleobotany, phycology, physiology and biochemistry, structure and development, systematics. It also publishes commentary and review articles on topics of current interest, contributed by internationally recognized scientists.

The journal will continue to be published in the same manner, with no changes in frequency or ISSN for both electronic and print formats, and the volume number will continue on from 2007.
Frequency: Monthly (12 issues/year)
ISSN: 1480-3305 (electronic); 0008-4026 (print)
NRC Research Press, Canada's foremost scientific publisher, publishes 16 peer-reviewed journal titles in the areas of science, engineering, and health; monographs; conference proceedings; and other allied publications. For a full list of titles, visit http://researchpress.nrc.ca.
For further information, please contact:

Mike Boroczki, Business Manager
NRC Research Press
National Research Council Canada
Ottawa, ON K1A 0R6, Canada

Revue canadienne de botanique renommée "Botanique"

Les Presses scientifiques du CNRC sont ravies d'annoncer qu'à compter de janvier 2008 la Revue canadienne de botanique sera rebaptisée Botanique.
Ce changement consolidera la position de la revue sur la scène internationale.

Publié depuis 1929, ce mensuel renferme des articles de recherche approfondie et des notes traitant de toutes les disciplines de la botanique, y compris la biologie cellulaire et moléculaire, l'écologie, la génétique, la mycologie et les interactions plantes-microorganismes, la paléobotanique, la phycologie, la physiologie et la biochimie, la structure et le développement, et la systématique. Il présente également des commentaires et des synthèses sur des sujets d'intérêt, soumis par des scientifiques de renommée internationale.

La publication de cette revue, de même que la fréquence de parution et les ISSN, demeurera inchangée. De plus, la numérotation des volumes se poursuivra comme auparavant.
Fréquence : Mensuelle (12 numéros par année)
ISSN : 1480-3305 (version électronique); 0008-4026 (version imprimée)
Les Presses scientifiques du CNRC, le plus important éditeur scientifique canadien, publient 16 revues du domaine des sciences, du génie et de la santé faisant l'objet d'un examen par des pairs, des monographies, des comptes rendus de conférences et des publications affiliées. Pour consulter la liste intégrale des revues, rendez-vous à http://pubs.nrc-cnrc.gc.ca/cgi-bin/rp/rp2_jour_f.
Pour de plus amples renseignements, communiquez avec :
Mike Boroczki, gestionnaire des Affaires commerciales
Presses scientifiques du CNRC
Ottawa (Ontario) K1A 0R6, Canada

Report on Plant Canada 2007

Art Davis, Vice President

A total of 41 C.B.A./A.B.C. delegates attended this meeting in the last week of June, 2007, in Saskatoon. This number from C.B.A./A.B.C. was much smaller than usual, and possible reasons may have included the relatively high cost of registration as well as the recent regularity of C.B.A./A.B.C. meetings with Plant Canada held in western Canada. As a member of the organizing committee, I felt that the scientific programme was excellent and I hope those C.B.A./A.B.C. members who attended were satisfied with it.

On behalf of our association's membership, I would like to express thanks to those who organized the two C.B.A./A.B.C. stand-alone symposia, "The Ontogeny of the Flower : the next generation" (Rodger Evans and Usher Posluszny) and "Floristics for the Future" (Deborah Metsger and Tim Dickinson). Also, there were two joint symposia, one with the C.S.P.P., "Education in Action" (Christine Maxwell and Greg Moorhead) and the other with C.W.S.S., "Plant Ecology and Invasive Species" (Paul Catling and David Clements). With involvement in 4 symposia, the C.B.A./A.B.C. was very well represented on the scientific programme.

I would also like to thank the Mycology section for agreeing to withdraw their symposium suggestion advanced at the C.B.A. meeting held at Concordia University in Montreal (2006). This allowed the other proposed C.B.A./A.B.C. symposia to be offered. I understand the Mycology section will be presenting a symposium at next year's joint C.B.A./B.S.A. meeting in Vancouver.

Finally, I thank Larry Peterson and Iain Taylor for their workshop on improving the quality of scientific writing, delivered at the start of Plant Canada 2007. It was directed especially to graduate students and younger academics and attracted an audience of over 30 participants!

Vancouver 2008

Call for Symposia

BOTANY 2008 Call for Symposia. The Call document can be found at http://www.2008.botanyconference.org/2008Calls/2008CallForSymposia.php.

As most of you perhaps already know, the call for Symposia for 2008 Botany Conference in Vancouver has been posted on the conference website (www.2008.botanyconference.org). If you or your section members are interested in and committed towards organizing a symposium please let either Dr. Lacroix or me know. (*Continued overleaf)*

Also, please feel free to contact me (santokh@interchange.ubc.ca) if you have any suggestions for the 2008 Botany conference.

Please note: Submissions close October 15, 2007.

Urgent Request!!!!

Karl J. Niklas (PresidentElect for the Botanical Society of America) has proposed the joint preparation of a video for the banquet at the 2008 joint meeting in Vancouver. Rather than the traditional "lecture", Karl would like to present a video outlining the history of North American Botany. Karl has invited CBA, as well as the president of the Mexican Society of Botany, to submit images to him to include in the video. My task, as CBA President-Elect, will be to organize the Canadian content. To this end, I hope that the members of CBA can help pull together as many Canadian botanical images as possible. Karl has requested images of the following people specifically:

Chauncey Delos Beadle
Louis-Ovide Brunet
Arthur Henry Reginald Buller
Edmund Wade Davis
Carrie Matilda Derick
William Francis Ganong
Charles Leonard Huskins
Gleb Krotkov
John Douglas MacLachlan
John Macoun
George Hugh Neil Towers

However, I'm sure there are many others that warrant inclusion in this list (e.g., Taylor Steeves, Rolf Sattler, and Ian Sussex to name a few that have influenced my career). Karl is also looking for pictures of present and past executive members. Finally, images of things botanically "Canadian" are also an important part of the video. Maybe we should include images of all things with the species name "canadensis."; maybe all species endemic to Canada. For the time being the only restriction is your imagination. Please send ideas and images to me as soon as possible as the three Presidents are keen to get the project rolling…

Rodger Evans, Biology Department, Acadia University, 24 University Avenue, Wolfville, NS B4P 2R6,Tel: (902)585-1710, Fax: (902)585-1059, E-mail rodger.evans@acadiau.ca

Future Meetings of CBA/ABC.

Following some discussion and expression of concerns at the 2007 Plant Canada meeting some changes have been made. The 2009 Plant Canada meeting which was scheduled for Halifax has been canceled. Instead the CBA/ABC will meet at Acadia University in 2009 at the end of June, with the CSPP, if they wish.

The 2010 meeting will be held in Ottawa. An offer was made for CBA/ABC to join SPNHC (Society for the Preservation of Natural History Specimens) for this meeting. Some concern was expressed at the AGM that these types of arrangements can mean the loss of CBA/ABC identity and a long period of time between CBA/ABC stand-alone meetings.
However, a motion was made at the AGM "That CBA/ABC join SPNHC for an overlapping meeting in 2010 in Ottawa". The motion carried.

New Webmaster.

Dr Daya Dayanandan has agreed to be the webmaster for the Association site. The new CBA web site development is currently in progress. If you have any suggestions including sample web sites and features that you would like to be included in the CBA web site, please let us know by emailing to daya@alcor.concordia.ca with the subject line "CBA web site suggestions".

News from the Sections

The Mycology Section

Report on the meeting of the Mycology Section, Plant Canada 2007
Prepared by Linda Tackaberry, Hugues Massicotte, and Shannon Berch

Seven people were in attendance for the annual Mycology section meeting. Of the topics discussed, the one of greatest interest addressed issues pertaining to the Weresub lecture and award. Discussion included creating a biography of Luella K. Weresub with some history of Luella and her life, linking this to the Weresub lecture and student prize, and publishing it in the CBA Bulletin.
The group examined ways in which to 'advertise' the Weresub Award for the best student paper in mycology, and agreed to promote the award more in the CBA Bulletin as well as other venues such as Inoculum (MSA) and Biology Departments in Canada (including trying to reach Canadian students who might be working abroad). All agreed that it was important to maintain the focus of the award on excellence in writing, in addition to sound scientific information.
Much discussion also occurred around who is now in charge of "carrying the torch" for the Weresub award, who was the last 'official' chair, and who is now taking responsibility for this committee. An ad hoc group had been organized this year (2007), but most felt that any future committee needs to more directly communicate with the CBA and the Mycology section. Some of the reasons cited were that the financial portion of the award is held by the CBA, donations are ongoing to this award through the CBA, and the award is given during the AGM of the CBA. A list was generated of some of the original committee members who judged past Weresub submissions and a suggestion made that the overall responsibility be passed to the CBA or the Mycology section, with original members remaining on the committee if they wish to continue, with the addition of at least one member from the Mycology section. The issue was not resolved, but a reassessment is ongoing. The Weresub discussion ended with suggestions regarding the selection and invitation of a local speaker for the Weresub Memorial Lecture for next year's 2008 meeting in Vancouver and several names were put forward.
With respect to next year's meeting with the Botanical Soc. of America in Vancouver, those present were in favour of organizing a symposium on fungus-plant interactions, including such things as endophyte associations. Several members volunteered to follow up on this and to address the need to select a CBA representative at UBC to assist in the process. Larry Peterson and Hugues Massicotte will circulate a symposium draft for suggestions.
Finally, suggestions for judges for the 2008 Cinq-Mars

award included Steve Bradbury, Larry Peterson, Hugues Massicotte, and Shannon Berch. There is a new form that is being used by judges and this form will, hopefully, facilitate the judging process.
Many thanks to those who attended the section meeting and who participated to the very thoughtful and lively discussions!

Rapport de la section-Mycologie, *Plant Canada 2007 Préparé par Linda Tackaberry, Hugues Massicotte, et Shannon Berch*

Sept participants se sont réunis pour la rencontre de la section-mycologie à Saskatoon. Plusieurs items ont été discuté, celui qui a généré le plus d'intérêt est au sujet du Prix Weresub et la conférence commémorative Weresub. Nous avons discuté la création d'une biographie de Luella K. Weresub, qui pourrait inclure plusieurs éléments de sa vie, reliant le tout avec la conférence et le prix, et espérant la publier dans le bulletin.
Nous avons examiné les façons de mieux rendre public le prix Weresub (pour meilleur article scientifique par un étudiant dans les domaine de la mycologie), et avons suggéré une meilleure promotion dans le bulletin, dans l'Inoculum (MSA) et autres départements de biologie au Canada (et même contacter des étudiants canadiens travaillant à l'extérieur du pays). Il est important de maintenir le focus du prix sur la qualité de la prose et du contenu scientifique.
Nous avons discuté comment maintenir une continuité scientifique pour le jugement du prix, qui est en charge, et qui prend la responsabilité du prix. Un comité ad hoc fut créé cette année (2007), mais nous sommes d'accord pour que les comités futurs soient en communication directe avec l'ABC et la section-mycologie, étant donné que l'ABC reçoit les donations et administre le prix Weresub. Une liste existe pour les anciens juges et nous suggérons que la responsabilité de juger le prix soit celle de l'ABC, avec certains des membres initiaux, s'ils veulent être impliqués, avec au moins un membre de la section-mycologie. Nous continuons à reexaminer la situation. Finalement, nous avons suggéré plusieurs noms pour un conférencier-Weresub local pour le congrès à Vancouver, en 2008.
Nous avons discuté aussi, par rapport au congrès 2008 avec le BSA, l'organization d'un symposium sur les interactions plantes-champignons, qui peut inclure les associations endophytiques. Plusieurs membres sont intéressés à suivre ce dossier, et de sélectionner un représentant ABC à UBC pour assister. Larry Peterson et Hugues Massicotte vont circuler une proposition pour le symposium.
Finalement, les suggestions pour juges 2008 Cinq-Mars sont Steve Bradbury, Larry Peterson, Hugues Massicotte, et Shannon Berch. Il y a une nouvelle forme que les juges peuvent utiliser pour faciliter le processus.
Merci à tous les participants!

News from the Teaching Section.

Christine Maxwell

The Teaching Section of the CBA held a successful joint session with the CSPP at Plant Canada 2007 in Saskatoon, entitled Education in Action. We had three excellent speakers. Malcolm Devine of Performance Plants Inc. in Saskatoon spoke on careers in Plant Biology, outlining his own career path, which he did not necessarily recommend! This was followed by Kate Frego, who described a novel method of teaching Plant Ecology, which she has developed at the University of New Brunswick at St. John. The method was developed in response to her desire to expose students to the primary literature in Plant Ecology as well as to use peer teaching in addition to the more common lecture and experimental lab exercises. Her abstract appears on page 80 of the conference program, which can be downloaded from the CBA website. Sheila Macfie from the University of Western Ontario, presented a very practical approach to the problems faced by many of us…how to maximize feedback to students while minimizing time and red ink. This method has been referred to as Macfeedback by her students. Sheila gave a number of suggestions and the file of her presentation can be obtained by contacting her (smacfie@uwo.ca) or me at cmaxwell@trentu.ca
Congratulations to Kate Frego, a regular contributor and secretary of the Teaching section, who has been named by the Association of Atlantic Universities (AAU) as one of the regions three top university educators! Kate from the Department of Biology, University of New Brunswick will receive the 2007 AAU Anne Marie MacKinnon Instructional Leadership Award for demonstrating a commitment to the improvement of university teaching within her own institution and beyond. She also won the AAU Distinguished Teaching Award in 2002, making her the first recipient of both AAU awards.



Kate Frego wins a teaching award

Report on the CBA/ABC Systematics and Phytogeography Section meeting at Plant Canada 2007

The CBA/ABC Systematics and Phytogeography Section met on Tuesday, 12 June 2007 at the Plant Canada 2007 meeting in Saskatoon. The meeting was chaired by Tim Dickinson, and this report is based on minutes taken by Deb Metsger. Three principal items were discussed: (1) The Systematics and Phytogeography Section's Alf Erling Porsild Memorial Prize; concern was expressed that there had been no nominations for our student paper prize, even after a request for nominations was placed in the last issue of the CBA/ABC Bulletin. The importance of raising the profile of the CBA/ABC awards was discussed, and Daya Dayanandan indicated that he would make this a priority in the redevelopment of the website. Tim Dickinson will e-mail Section members to encourage them to make nominations, and reminding them that membership in CBA/ABC is not a prerequisite for receiving an award. Rather, the award may be given to any Canadian student at a foreign university, or to any student at a Canadian university. Judges for the Porsild Prize next year will be Suzanne Warwick, Sylvia Taylor, and Luc Brouillet. (2) Systematics and Phytogeography Section judges for next year's Lionel Cinq-Mars Award; Luc Brouillet and Sylvia Taylor agreed to take this on. It is not yet clear how the Cinq-Mars Award will work in the context of the larger Botany 2008 meeting in Vancouver. (3) Symposium proposals for Botany 2008 and for the CBA/ABC 2009 meeting to be held in the Maritimes; a symposium on Phytogeography will be organized by Anne Bruneau for Vancouver next year. For the 2009 meeting, section members are invited to propose symposium topics that will benefit from the Maritimes venue.

Association Awards for 2007

The Lawson Medal



Dr Scott Redhead receiving his award fromChristian Lacroix. Photo C Maxwell

First awarded at the 1969 Annual Meeting, the Lawson Medal, the most prestigious award of the CBA/ABC, was established "to provide a collective, formal expression of the admiration and respect of botanists in Canada for excellence in the contribution of an individual to Canadian botany". It is named in honour of Dr. George Lawson, who is generally regarded as Canada's first professional botanist.
Lawson Medals may be awarded each year in two categories of eligibility:
(A) Recognition of a single outstanding contribution to botanical knowledge
(B) Recognition of cumulative, lifetime contributions to Canadian botany

This year, the Lawson medal is awarded to Dr. Scott Readhead in recognition of lifetime contributions to Canadian botany. Dr. Readhead is based at the Eastern Cereal and Oilseed Research Centre in Ottawa. His primary areas of research are the Canadian mushroom flora, systematics, and biogeography. An on going aspect of research has been the clarification and delimitation of the genera of Canadian mushrooms. Towards this end he has described several new genera to accommodate species which were anomalies. He has monographed, described new taxa for, or provided revisions of 56 higher basidiomycete genera in Canada and North America. He is also Curator of the National Mycological Herbarium of Canada which houses 340,000 fungal specimens.
His own research is extremely active and involves much international collaboration. He has collected fungi extensively throughout Canada, from the Maritimes to Prince George Islands. He has also collected extensively in the United States and Europe. His seminal work (CJB, 1989) on the biogeography of fungi is perhaps the most often cited of his early papers.His list of publications cannot fail to impress by the breadth of knowledge, the degree of collaboration, and the impact on all aspects of mycology. It is rare that one picks up a new mycological journal that does not have an article by, about or related to him. He has authored or co-authored almost over 170 peer-reviewed and popular papers dealing with basidiomycete & ascomycete taxonomy and the edible mushroom harvest. His taxonomic papers, which include numerous significant monographs, describe 62 species new to science, erect 20 new genera and 2 new families, and propose 400 new names. His contributions to mushroom taxonomy are considerable, and his encyclopedic knowledge of basidiomycetes has enabled him to support many new genera by linking DNA sequence data analyses to important key morphological characters. These insights will be greatly appreciated by future field mycologists.
Scott's work on the biogeography of Canadian mushrooms, especially with commercially harvested species such as chanterelles and pine mushrooms, has done much to support research and development of the edible mushroom industry. He has published definitive taxonomic papers on these important non-timber forest products for fellow researchers and organized or spoken at scientific conferences both inside and outside Canada, but Scott has also encouraged amateur and professional mushroom hunters by writing for popular periodicals such as MUSHROOM, THE JOURNAL OF WILD MUSHROOMING, aimed at people who 'like to hunt, name, cook, study and photograph wild mushrooms.' He has served as 'guest mycologist' for numerous North American Mycological Association (NAMA) meetings, beginning in Whistler BC in 1990. Aware that many amateurs do not 'see' differences between species with the naked eye, he has linked microscope to TV to demonstrate how two similar mushrooms appear dissimilar 'up close and personal.'
I'd like to finish this citation with a testimonial from a colleague of Dr. Redhead's: " I have known Scott since the late 1970s. I was a naive young park naturalist in Algonquin Park who wanted to learn to identify mushrooms and other fungi in order to lead 'mushroom hikes' for the camping public. Then I decided to write a checklist of the park's fungi, updating the nomenclature on specimen labels that dated back to the 1920s. Scott, along with other Ag Can scientists Jim Ginns, Luella Weresub, Robert Shoemaker, and Keith Egger, took me under their wing and provided tremendous mentorship, encouragement and assistance. When I made visits with specimens to identify or seeking obscure taxonomic literature, Scott always took time to help, and included me as part of the group round the table at morning and afternoon tea-time."
Congratulations Dr. Redhead.

Mary E. Elliott Service Award

The Mary Elliott Service Award is given to an individual for meritorious service to CBA/ABC. It was first awarded in 1978 in memory of Mary E. Elliott, who was a victim of homicide in September, 1976. She had just completed four consecutive years of service on the Board of Directors (as Secretary, Vice President and President), and was just at the beginning her term as Past President at the time of her death.
Mary Elliott was a plant pathologist and mycologist who spent 28 years with Agriculture Canada at the Central Experimental Farm in Ottawa. She was well known for her work on the taxonomy and biology of the Sclerotiniaceae. In 1975 she became Curator of the National Mycological Herbarium. Mary was also very active in identifying fungi for the public and in contributing to and editing (1970-71) a publication of the Biosystematics Research Institute for public information called Greenhouse-Garden-Grass. (*Continued overleaf)*

This year, the award goes to Christine Maxwell. Christine came to Canada in 1965 and was appointed Demonstrator in Biology at Trent University. She has been at Trent since that time and recently retired as Associate Professor. Throughout her career, she contributed strongly in research, teaching, and service.

Let me quote from the nomination letter: "for the last 15 years Christine has worked at the CBA executive level to ensure that the annual meetings remain and improve as places and times for undergraduates and beginning graduate students to join our community. The CBA teaching section took on a life of its own with Christine at the helm and continues to direct us all to keep botanical education as one of the Association's main aims. In 2006, just as retirement was approaching, she undertook the task of editing the CBA bulletin. While she has shown clearly that she intends to continue her commitment to CBA, it is surely time for the Association to recognize her outstanding achievements and contributions"

(*Editor's note: I am thrilled by this award, especially since it is the last award that will be crafted by Doug Larson. Thank you to Doug for this and all the other ME awards produced over the years!)*



Christine Maxwell receiving her award from the president. Photo: K Frego

Student awards and travel bursaries

AWARDS FOR PAPERS PUBLISHED BY STUDENTS

J. Stan Rowe Award



Dr. Christian Marks. Photo:from his website

This award was established to celebrate the life and work of Canadian Plant Ecologist Stan Rowe (June 11, 1918 to April 6, 2004).

The winner of the J. Stan Rowe Award this year is Dr. Christian O. Marks for his paper co-authored with supervisor Dr. Martin Lechowicz, entitled: Alternative Designs and Evolution of Functional Diversity published in the American Naturalist 167(1): 55-66.

This paper builds on a model that Dr. Marks developed for the tradeoffs among traits governing the growth and survival of tree seedlings. The paper is a benchmark in the field of functional ecology that is having significant impact. Although only recently published, it has already been cited in leading ecology journals such as Ecology Letters, American Naturalist, Evolution and Functional Ecology.

Thank you to co-Chairs of the Ecology Section Adrianne Sinclair and Paul Catling as well as reviewers Jeremy Lundholm (St. Mary's) and Steven Vamosi (Univ of Calgary) for evaluating the nomination.

Luella K. Weresub Award

Co-winners: Michael Lynch (UWO) and Susan Robertson (UNBC)

This award was established in the memory of Dr. Luella Kayla Weresub (1919-1979), a well-known Canadian mycologist who had worked at the Biosystematics Research Institute of Agriculture Canada since 1957. Dr Weresub was a very active member of CBA/ABC, serving as a Director from 1971 to 1973.

Based on the comments of the judges (Jim Traquair (Mycologist AAFC London), John Klironomos (Mycologist, U. Guelph), Katherine Dobinson (Fungal Geneticist AAFC London), and Ed Topp (Microbial Ecologist AAFC London), the panel recommends that the Luella Weresub Award be split between two candidates, Michael Lynch and Susan Robertson.

The two winning papers are:

1-Diversity of basidiomycetes in Michigan agricultural soils, by Michael Lynch and Greg Thorn, published in Environmental Microbiology (2006) vol 72: 7050-7056.

2-Ectomycorrhizal fungal communities of black spruce differ between wetland and upland forests, by Susan Robertson, Linda Tackaberry, Keith Egger & Hugues Massicotte, published in Canadian J of Forest Research (2006) vol 36: 972-985

Full paper citations:

The submissions were evaluated in three equally weighted categories (originality, scientific impact, and use of language/presentation). Both papers are equally well-written with clear objectives, methods, results and discussion of the mycological and ecological findings.They are both a credit to the memory of Luella Weresub. They make a significant contribution to our understanding of basidiomycete diversity in forest and agricultural soils using state-of-the art molecular techniques for the identification of the functional vegetative phase of soil fungi.

The paper by Michael Lynch reveals an astounding diversity of basidiomycetous fungi not previously detected and highlights the importance of reliable GenBank data. The work stems from his M.Sc. degree while at UWO under the supervision of Greg Thorn. Michael is now pursuing a PhD at U of Waterloo with Dr KM Müller on the evolution of cryptic species within the Rhodophyta.

The paper by Susan Robertson highlights significant variation in ectomycorrhizal fungal community structure along a

moisture gradient and offers a prediction for the success of black spruce and its ectomycorrhizal associates in adjusting to the inevitable climate change. The work stems from her M.Sc. degree while at UNBC under the supervision of Hugues Massicotte. Susan is currently pursuing a PhD at UNBC with Mike Rutherford and Hugues Massicotte on the contribution of mycorrhizal systems to the degradation of petrochemicals.



Susan Robertson. Photo: Supplied by Susan.

Michael Lynch. Photo:Supplied by Michael.



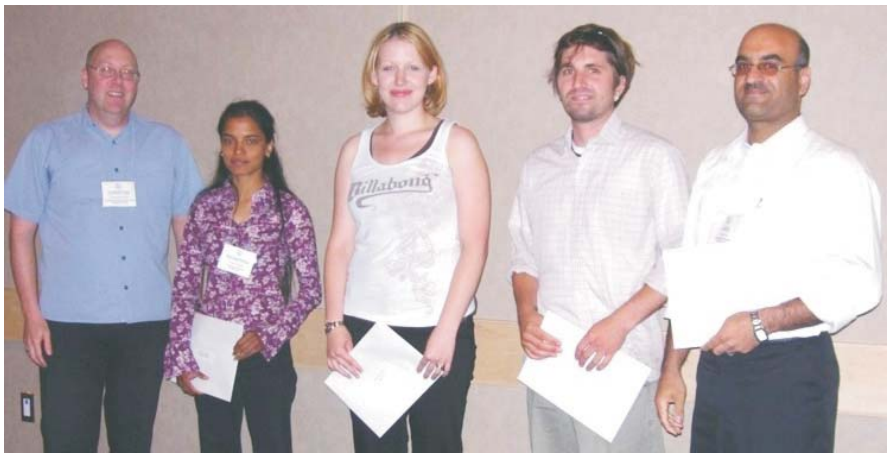
Weresub winners

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STUDENT TRAVEL AWARDS

John Macoun Travel Bursary

This cash award, first presented in 1986, was established to provide partial financial assistance for travel to the Annual Meeting to a student (or students) presenting a paper in the Lionel Cinq-Mars competition or a poster in the Taylor competition. In 1988 the Bursary was named in honour of John Macoun (1831-1920), who was official botanist on five major Canadian expeditions and was, in 1881, appointed Botanist to the Geological and Natural History Survey of Canada. He was also a member of the Botanical Society of Canada (1860-62) and was a founding fellow of the Royal Society of Canada.



This year, travel bursaries were awarded to 4 students:·
Cameron Wagg (Guelph)
Julia Nowak (Guelph)
Jamil Vaezi (U de Montréal - IRBV)
Sugirthini Selliah (U de Montréal - IRBV)

Christian Lacroix with the Macoun Travel Bursary winners. From left to right, Sugirthini Selliah,Julia Nowak,Cameron Wagg and Jamil Vaez.

STUDENT AWARDS FOR ORAL AND POSTER PRESENTATIONS

Iain and Sylvia Taylor Award

The Canadian Botanical Association gives an award for the best student poster presented at the Annual Meeting. The award is made in honour of Iain and Sylvia Taylor, two members who have for many years actively contributed to the development of the CBA.



The poster award presentation. From left to right, Christine Maxwell, Wade Caswell, Iain Taylor and Sylvia Taylor. Photo: Kate Frego

The posters were evaluated by a committee consisting of Moira Galway and Cindy Ross, chaired by Christine Maxwell. The winner was Wade Caswell, University of Saskatchewan, for his poster " Ultrastructural features of the floral nectary in ornamental loosestrife", co-authored with Art Davis.

Lionel Cinq-Mars Award

This award was established in 1976 "for the best oral presentation by a student of his or her own research, as a contributed paper at the Annual Meeting". In 1978 the award was named in memory of Lionel Cinq-Mars (1919-1973), a charter member of CBA/ABC and a member of the first Executive (1965-66). Cinq-Mars was an expert field botanist, amassing a personal herbarium of about 10,000 sheets. He was considered an expert on the genera Viola and Amelanchier.

Oral presentation were evaluated by a panel of judges and chaired by Rodger Evans.
The winner this year was Alanna Yorke from Acadia University for her paper titled “Genetic variations and phtogeography of Nova Scotia’s isolated populations of *Helianthemum canadense* (L) Michx. as revealed by AFLP markers, co-authored with Rodger Evans.

Two honourable mentions were made, Wade Caswell (University of Saskatchewan) for his paper, “ Evaluating flower visitors as pollinators of *Lythrum salicaria* (purple loosestrife), co-authored with Art Davis, and Cameron Wagg (University of Guelph) for his paper “ Soil fertility and mycorrhizal association influenceson lodgepole pine and interior hybrid spruce seedling growth”, co-authored with Brian Husband, Hugues Massicotte and Larry Peterson.



Alanna Yorke, Acadia, Winner of the Lionel Cinq Mars Award.



Honourable mentions were given to Cameron Wagg, (centre) and Wade Caswell, by Rodger Evans, (left). Photo: C. Maxwell

Plant Canada 2007



Art Davis congratulates Wade Caswell on his successes in two competitions. Photo: C. Maxwell



Marian Munro enjoying the banquet Photo: C. Maxwell



Banquet group: L to R, Zeina Nasr, Denis Barabé, Jamil Vaezi, Luc Brouillet, and Christian Lacroix .Photo: C Maxwell



The reception. Left to right Scott Redhead,Dianne Fahselt, Jane Young, Linda Tackaberry.Photo: C. Maxwell



The dinner table. Left to right, Sylvia Taylor, Iain Taylor, Linda Tackaberry and Hugues Massicotte. Photo: C Maxwell



Erin Zimmerman with her poster Photo: C Maxwell

NATIVE PLANT EMBLEMS OF CANADA - 4. PRINCE EDWARD ISLAND

E. Small and P.M. Catling, National Environmental Program, Biodiversity Section, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa ON K1A 0C6



FLORAL EMBLEM: PINK LADY'S-SLIPPER



Fig. 1. Pink lady's-slipper (*Cypripedium acaule*). Source: Canadian Heritage. 2002. Symbols of Canada (revised). Canadian Heritage, Ottawa, ON. Reproduced with permission of Canadian Heritage, Public works, and Government Services Canada.

SYMBOLISM

In Chinese culture, orchids symbolize unity and modesty, while in the West they are often said to express love and affection, although there is no indication that these admirable sentiments played a role in an orchid becoming PEI's floral emblem. A local naturalist was responsible for the choice of the lady's-slipper orchid as the provincial symbol of P.E.I. in 1947. There seems to be no particular historical reason for the choice, other than the fact that the plant is widely considered to be one of the most beautiful of wildflowers. Like the Islanders, it inspires admiration without ostentation. The alternative name “mocassin flower” serves as a reminder of P.E.I.'s original native inhabitants, the Micmac.

LATIN NAMES

Cypripedium acaule Aiton

The genus name *Cypripedium* is based on a combination of two Greek words: kypris, a name of Aphrodite (equivalent to the Roman goddess Venus) that was once used on the island of Cyprus, and pedilon, a slipper, referring to the shape of the flowers. The epithet *acaule* in the scientific name is Latin for “stemless” (or apparently so, since the plant does have a subterranean stem). The scape (flower stalk) is leafless, and therefore presumably this was not considered to be a “stem” when the epithet was adopted. *Cypripedium acaule* is the only species in its genus that has only basal leaves.

ENGLISH NAMES

Pink lady's-slipper (the hyphen is used in most authoritative works, but is frequently omitted elsewhere), pink ladyslipper, small pink lady's-slipper, lady's-slipper, lady's-slipper orchid, common lady's-slipper, stemless lady's-slipper, two-leaf lady's-slipper, two-leaved lady's-slipper, mocassin flower, pink mocassin flower, American valerian, nerve root, shepherd's purse, squirrel's shoe, whip-poor-will's shoe. The pink lady's-slipper is usually called simply the lady's-slipper when referring to the provincial flower of P.E.I., but other species of *Cypripedium* are also called lady's-slipper. The words “slipper” and “mocassin” are based on the shape of the largest petal, which forms a pouch resembling shoeware.

FRENCH NAMES

Le sabot-de-la-vierge, sabot-de-Vénus, cypripède acaule, cypripède rose, soulier-de-Notre-Dame.

HISTORY

a. Canada

The “lady's-slipper” was chosen as the floral emblem of P.E.I. in 1947, but a particular species was not mentioned. Of the three species of *Cypripedium* found in the province, the showy lady's-slipper (*C. reginae*) was generally accepted as the floral emblem. However, in the early 1960s not enough plants of this locally rare species could be found on the island to prepare a display for the Fathers of Confederation Building in Charlottetown. Naturally there was concern that the showy lady's-slipper was too rare in the province to be an emblem. In 1965 the much better known and widespread pink lady's-slipper, *C. acaule*, was recognized as the new emblem in an amendment to the PEI Floral Emblem Act.
The pink lady's-slipper is the logo of Native Orchid Conservation Inc. (founded in Manitoba in 1998; http://www.nativeorchid.org/aboutnoci.htm).



Fig. 2. Painting of pink lady's-slipper (*Cypripedium acaule)* in its natural setting, from the Walter Coucill Canadian Centennial official flowers of Canada series (see Coucill 1966 cited in #1 of this series). Reproduced with the permission of the copyright holders, the Coucill family.

b. Foreign

Orchids are official flowers of Belize, Brazil, Cayman Islands, Columbia, Costa Rica, Equador, Guatemala, Honduras, Indonesia, Panama, Seychelles, Singapore, and Venezuela. *Cypripedium acaule* was adopted as the official state wildflower of New Hampshire in 1991. The showy lady's-slipper (*C. reginae*) became the state flower of Minnesota in 1902



Fig. 3. Pink lady's-slipper (*Cypripedium acaule*). Photo courtesy of Brian L. Simpson, Government of P.E.I.

APPEARANCE

Cypripedium acaule generally grows in small colonies, although it has been observed to form populations of several thousand. The short, perennial, rhizome (underground stem) produces two (rarely three) dark green, strongly veined basal leaves (9-30 cm long × 2.5-15 cm wide, or 3.5-12 inches × 1- 6 inches), and a flowering axis (“scape”) with a single flower. A single green bract arises from the floral stalk and arches over the flower. The overall height of the plant is 10-60 cm (4- 24 inches). The pink or white flowers are usually 30- 65 mm (1.2- 2.5 inches) long, and often have a pleasant fragrance. The size of the flower and the plant can vary greatly. In fact a flower at one locality may be larger than a whole plant at another locality. A detailed description of the rather complicated floral structure is provided below in the discussion of pollination. After fertilization, the flower develops into a green capsule which turns brown, opening and liberating numerous tiny seeds (sometimes over 50,000). The plant also spreads vegetatively, the rhizome forming new rosettes very close to the old flowering plant, this process continuing for half a century or more if the habitat is not altered.

CLASSIFICATION

Family: Orchidaceae (orchid family).

The orchid family may be the largest family of flowering plants, with perhaps 25,000 species.
The name “lady's-slipper” is used in a broad sense for the orchid genera in subfamily Cypripedioidea, including *Cypripedium, Mexipedium, Paphiopedilum, Phragmipedium*, and *Selenipedium*. The genus *Cypripedium* has about 50 species, found in North America, Central America, Europe, and Asia. China has the largest number of species. Of the 12 North American species, eight are native to Canada.

GEOGRAPHY

The species is native to all provinces of Canada except British Columbia, as well as Northwest Territories. In its northernmost range in Canada, pink lady's-slipper is distributed from the MacKenzie Valley in Northwest Territories through Lake Winnipeg and the Great Lakes area to the southern shore of James Bay and eastward to the Manicouagan Reservoir in Quebec, and to Newfoundland. In the eastern US, the plant extends from Minnesota south to Tennessee, Mississippi, Alabama, and Georgia.

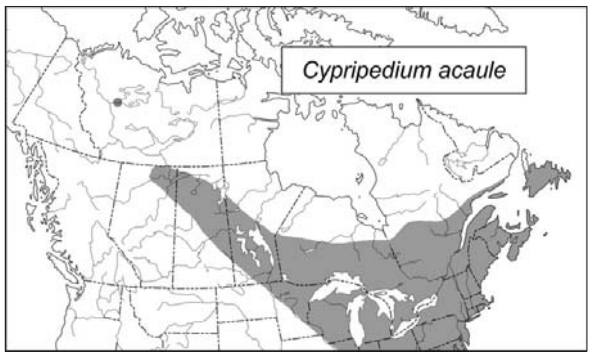


Fig. 4. Canadian distribution of pink lady's-slipper (*Cypripedium acaule*).

ECOLOGY

Cypripedium acaule appears adapted to growing in early forest succession, when gaps in the canopy allow moderate light to reach the forest floor. With increasing closure of the forest, growth of the orchid colony decreases. However, with canopy disturbances, increased light will re-invigorate the plants for a period. Under natural circumstances, this orchid probably thrived in middle-aged and mature pineries (extensive pine groves) that developed on mineral soil following a fire. Individual plants may live for 100 years (the median age has been estimated to be 24 years), but flowering may be prevented by environmental conditions, and fruit formation is relatively uncommon in some populations.

Habitat

The pink lady's-slipper occurs in a variety of both wet and dry, shaded and semi-shaded sites in boreal and temperate regions. It is most common in shady coniferous woods, especially under pines, but also occurs in deciduous forests, swamps, sphagnum bogs, and barrens. The acidic substrate usually has considerable humus, but the species also occurs in sand or gravel on rocky or mossy slopes. The roots generally are confined to the well-oxygenated humus layer, but occasionally extend into a lower mineral portion of the soil.

Inter-species Relationships

All orchid seeds are tiny and lack well-developed embryos. To germinate and grow in nature, the seeds must become associated with a fungus, often a *Rhizoctonia* species. The mycorrhizal fungus is thought to be necessary for the roots to obtain sufficient water and nutrients. To survive, the orchid seed must be penetrated by fungal filaments (hyphae). Although most of the literature describes the association as symbiotic, the extent to which the relationship is actually mutually beneficial is unclear, and it has been suggested that the orchid is actually a parasite on the fungus, at least for the first few years of growth. After an orchid seed germinates, it produces a small mass of below-ground tissue that relies for years on the fungal filaments to supply water, minerals, and carbohydrates.

Pollination & Dispersal

Orchid flowers are modified from those typical of most other plant families. There are three sepals and three petals, but one of the petals, called the labellum or lip, is highly modified. The male part of the plant usually consists of just one or two stamens, and these are fused to the female part of the plant, the pistil, to form a cylindrical structure called the gynostemium or column. The pollen in the stamen's anther sacs is picked up and transported as a sticky mass in many lady's-slipper orchids, but the pollen of *C. acaule* may be less sticky than that of other species. A sticky mass of pollen is often referred to as a pollinium or a pollinarium, but this term is probably best applied to the more complex structure by which pollen is transported in the majority of orchids.

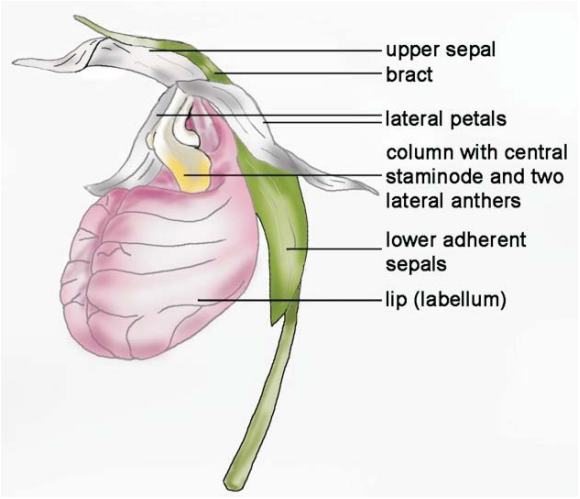


Fig. 5. Parts of a flower of *Cypripedium acaule*. Drawn by B. Brookes

In the case of pink lady's-slipper, one of the sepals is uppermost in the flower. The other two sepals are joined together behind the lip. The sepals and the two lateral petals are yellow-green to purplish-brown. The lip, at the bottom of the flower, is pink (less often white) with red or purplish veins. The pouch-like lip is specialized to act as a trap, temporarily imprisoning a visiting insect pollinator, and guiding its escape along a passageway that causes the insect to brush first against the stigmatic surface, depositing any pollen that it is carrying, and then passing against an anther, thereby picking up a new load of pollen as it exits by one of the openings at the base of the lip. The pollinator, usually a queen bee (of genera such as *Bombus* and *Psithyrus*), enters the lip through the large slit at the bottom, but the in-rolled edges and slippery inner surface make it difficult to escape from this entrance. Hairs on the inner surface lead to the two exits on either side of the column at

the base of the flower. Once a flower is fertilized, the petals droop, discouraging additional bee visits. In the fall, slits open in the capsule and the tiny seeds are released and carried away by the wind.

Orchid flowers attract pollinators to transfer pollen by two principal methods: providing them with actual rewards such as nectar, or deceptively luring them to the flower. The pink lady's-slipper is thought to lure bees by using bright flower colour, nectar guides (petal markings that in most flowers actually guide pollinators to nectar), attractive odours, and the architecture of the opening.

In Canada, flowering occurs from the middle of May to early July. In the Great Lakes region, late hard spring frosts can ruin the flowers of most plants in a population, and such natural catastrophes appear to explain in part a generally very low production of seed capsules. A dearth of pollinators in much of the natural range of *C. acaule* also seems to be responsible for low seed set. Recent studies have suggested that a large population of bee pollinators, maintained by a local abundance of heath family shrubs, is a major factor in promoting seed production by the orchid. Aerial spraying of insecticides to control pests in New Brunswick forests has been shown to reduce bee populations with consequent reduction in seed set by *C. acaule*, and the species has been considered “high risk” with respect to insecticides. It has been found that the pink lady's-slipper can be artificially selfed, but in nature only outcrossing occurs.

USES

The only modern substantial use of the pink lady's-slipper is as an ornamental, but in the past it was considered to be an important medicinal plant. The old name “nerve root” reflects wide use of the plant in 19th century North America as a sedative for nervous irritability, nervous headaches, hysteria, insomnia, menstrual irregularities accompanied by pre-menstrual syndrome, and mental depression. The old name “American valerian” is based on the similar use of *Valeriana officinalis* for nervous complaints. The roots have also been used to treat stomach ache, kidney and urinary tract disorders, and venereal disease. Today, there is only very limited medicinal use of *Cypripedium*, by herbalists (health practitioners who specialize on the use of crude plant materials).

CULTIVATION

Growing orchids has become a popular activity, and several species are relatively easily cultivated in semi-shade, on a damp acidic soil rich in humus. Pink lady's-slipper seems like an appropriate subject for a woodland garden or shady border, but it is difficult to grow and is best left in the wild. The following comments are from Larry Sherk's out-of-print “Growing Canada's floral emblems” (Canada Dept. Agric. Publication 1288, 1967; cf. similar comments in French in Lamoureux and Nantel 1999, cited below):
“This is the hardest of the provincial flowers to grow and maintain in the garden over a long period. This plant, more than any of the other floral emblems, must be preserved in native stands. Buying plants from wildflower dealers is almost a complete waste of time and money. It contributes to the depletion of native stands because the dealers get their plants from the wild....

To move plants endangered by construction, dig them either in early spring or in the fall. Take as large a block of earth as possible with them because the roots spread out near the surface for 2 feet or more. Plant them in a light acid mixture of pine needles and sand, in a spot that is shaded for at least the hottest part of the day, preferably under pine trees. These plants may grow and flower for a few years.”

Lady's-slipper should not be picked or transplanted. It rarely survives a change of habitat. The extensive, fragile root system in particular is easily damaged. In nature, germination from seed to flowering can take 10-16 years. There has been extensive experimentation on growing the seeds in artificial culture without the use of the fungus necessary for reproduction in the wild, but it is not yet clear that a commercial method of doing this consistently has become available for the pink lady's-slipper (see Durkee 2000 for information on growing conditions). Unfortunately, some suppliers offering material claimed to have been commercially propagated have supplemented their stock with wild-collected plants. Amateurs can attempt to propagate the plant from seeds by surface-sowing them as soon as they are ripe, and maintaining them on continuously damp organic material, which should be taken from near an established plant to ensure that the required fungus is present. Division of pot-grown plants is also possible, separating part of the original rootball with the soil intact, although as noted above the plants respond poorly to having their roots disturbed. Division has been recommended either in early spring or towards the end of the growing season. As with other orchids, addition of fertilizers or fungicides can harm the fungus that the plants depend on to assist them in obtaining nutrients from the soil.

CONSERVATION STATUS

Native orchids usually require specialized and often temporary habitats that are very vulnerable to human influence. Road building, draining of wetlands, and land clearing have reduced the living space of numerous orchids. Indiscriminate use of insecticides has eliminated many essential pollinators. Because they are so attractive, people have tried to transplant orchids, or simply to pick the flowers, reducing the chances of survival.

The pink lady's-slipper is fairly common in Canada, and therefore is not protected by federal legislation. In Nova Scotia, *C. acaule* is considered endangered (i.e., in danger of extinction throughout all or a significant portion of its range) and is a protected plant. In Alberta the species has been judged “May be at risk” (The general status of Alberta wild species 2000; http://srd.alberta.ca/fishwildlife/speciesatrisk/pdf/2000_General_Status_Species_Rpt.pdf).

The pink lady's-slipper is not federally endangered in the US, but is at risk in some states. It is considered endangered in Illinois and Tennessee, and threatened in Georgia. The New Hampshire Plant Protection Act lists *C. acaule* as a plant of “Special Concern” (a species that is not rare in the state, but is vulnerable to over-collection because of its showy nature). Similarly in New York State, where all native orchids are protected, the pink lady's-slipper has the status "Exploitably Vulnerable." Although rare in some areas, *C. acaule* has become more abundant in parts of the northeast, especially in New England, due to the establishment of pine plantations

and natural forest development on abandoned marginal farmlands.

Cypripedium orchids, along with many other orchid species, are listed in Appendix II of CITES (Convention on International Trade in Endangered Species), making it illegal to export any part of the plants without a permit. However, most countries will not accept trade in wild-collected slipper orchids, so essentially all legal international commerce in these plants is based on artificially propagated plants. *Cypripedium acaule* is not yet commonly propagated, so there is very little trade in this species.



Fig. 6. A white-flowered pink lady's-slipper (*Cypripedium acaule*) in Norfolk Country, southwestern Ontario. Although rare in Ontario populations, this white form is frequent in some New Brunswick and Quebec populations. Photo by P.M. Catling

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- In the 19th century, *C. acaule* was thought to possess narcotic properties, “especially when inhabiting dark swamps.”
- Crab spiders (the family Thomisidae) sometimes sit on the pouches of *Cypripedium* orchids in the distribution range of *C. acaule*, using the flowers as convenient locations to ambush small insect visitors. Crab spiders are commonly called "flower spiders" because of this hunting method. They are called crab spiders because their first two pairs of legs are held out to the side giving them a crab-like appearance, and they move sideways and backwards more easily than forwards, like crabs. These attractive spiders, variously coloured yellow, white, and pink, are harmless to humans.
- Contact with lady's-slipper can cause dermatitis in some individuals, that has been compared to poison ivy. The plant is covered with tiny glandular hairs, and the secretions can produce rashes. It has been suggested that this is more likely when the plants are wet. The causative agent is a quinone (defined as an aromatic benzene molecule containing a double ketone functional group) called cypripedin (a word more generally applied in the past to medicinal preparations of dried *Cypripedium* roots). Quinones from a variety of plant species, including several other *Cypripedium* species, are known to cause rashes.
- Prince Edward Island, the only province of Canada to have an orchid as a provincial symbol, is the only province that does not have an orchid society. (For a list of Canadian orchid societies, see http://www.chebucto.ns.ca/Recreation/orchidcongress/cocmemb.html.)
- Although the orchid family is huge, *Vanilla planifolia*, the source of vanilla, is the only species that has commercial significance as food. Plain old vanilla is the favourite ice cream flavour, accounting for 29% of all North American sales. Recently, flowers of orchids such as *Dendrobium phalaenopsis* have been used to garnish meals in expensive restaurants. Most of those used for this purpose are edible.

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(Continued overleaf)

Editor’s note/ Note de la rédaction.

I apologize for not including the French version of the News from the Sections in the last issue.
Secondly, in the obituary for Paul Gorham, credit for the photo of Paul taking notes in the field should have been given to Wayne Carmichael, and credit should have been given to Dale Allen for the photo of graduate students working in the boat with Paul.
A priori, nous nous excusons de ne pas avoir inclus la version française des Nouvelles des sections dans la dernière édition.
Deuxièmement, dans l’article nécrologique de Paul Gorham, la mention de provenance pour la photo de Paul qui prend des notes sur le terrain devait être attribuée à Wayne Carmichael et la mention de provenance pour la photo des étudiants de troisième cycle qui travaillaient sur le bateau avec Paul, devait être attribuée à Dale Allen.

TREE: RED OAK



Fig. 7. Silhouette of a red oak (*Quercus rubra*) tree. Source: J.L. Farrar 1995. Trees in Canada. Canadian Forest Service and Fitzhenry and Whiteside, Markham, ON, Canada. Reproduced with permission.

SYMBOLISM

As the provincial tree of Prince Edward Island, red oak has been said to represent growth, strength, and longevity. The tree appears on the flag, and also on the coat of arms which bears the Latin motto Parva sub Ingenti ("Little under the Great"), with a large oak tree (representing England) beside three small oak trees (representing the three provincial counties of Kings, Queens, and Prince).

The "Black Rod" traces to 1348, when the British monarchy used a kind of club to deny admission of unauthorized persons to Windsor Castle. By 1642, the British House of Commons had reversed this usage, using the club to symbolically deny entry to King Charles I. As in several other provinces, in P.E.I. the Sergeant-at-Arms or some other designated official now carries a Black Rod preliminary to several ceremonies and occasions. In P.E.I., the Black Rod is made from the Island's red oak.

Two 1871 pennies, with the provinces oak motif, are the only coins ever minted for P.E.I. alone. They show Queen Victoria on the face, and the red oak on the reverse.



Fig. 8. Pre-confederation (1871) bronze penny minted for PEI. The province joined Canada in 1873. The large red oak symbolizes Great Britain and the three small oaks symbolize the three counties of P.E.I.

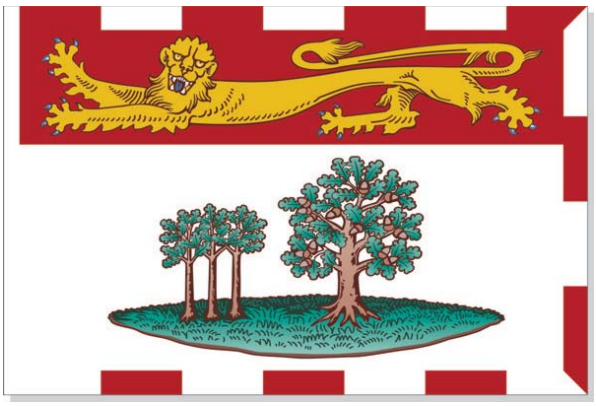


Fig. 9. The provincial flag of Prince Edward Island. The golden lion represents England, as does the largest oak tree.



Fig. 10. The provincial Coat of Arms. The blue jay (provincial bird) at the top holds a leaf and acorn of red oak. The native foxes reflect the old industry of fur farming. The fox at the left wears a necklace of potato blossoms, while the fox at the right has a necklace made of fishing net, again symbolic of P.E.I. natural resource industries. Botanical symbols at the bottom include roses for England, lilies for France, thistles for Scotland, shamrocks for Ireland, and lady's-slipper for the Island.

LATIN NAMES

Quercus rubra L. (The old synonym *Q. borealis* is occasionally encountered in the literature.)

The genus name *Quercus* is the old Roman word for oak (less plausibly, some authorities derive the word from the Celtic *quer*, fine + *cuez*, a tree). *Rubra* in the scientific name is Latin for reddish, and much of the plant is indeed reddish. The buds are dark reddish-brown (and may have tufts of reddish hairs), the twigs are reddish-brown, the leaves (petioles and blades) are often red-tinged (especially in the autumn, when the leaves turn deep red, rust, or copper), and the wood often is reddish.

ENGLISH NAMES

Red oak has also been called common red oak, American red oak (a name used in Europe), eastern red oak, gray oak, mountain red oak, and northern red oak (for additional information, see Classification).

FRENCH NAMES

Chêne rouge, le chêne rouge d' Amérique (name used in Europe), chêne boréal.

HISTORY

a. Canada

The red oak was adopted in 1987 as the provincial tree of Prince Edward Island.

b. Foreign

Oaks are among the most important of political symbols. The oak is the national tree of the Republic of Ireland. It is also an unofficial emblem of England, for example having appeared on money (e.g. pound coins). Latvia has two national trees, one of which is the English oak (*Q. robur*), and oak branches are shown on the national coat of arms. The coat of arms of Cuba shows a palm, along with an oak and laurel branch. In 2004 the United States Congress designated the oak (no particular species) as the National Tree of the US. The live oak (*Q. virginiana*) was adopted as the state tree of Georgia in 1937. Live oak branches occur on the state seal of Texas. Illinois adopted the oak as its state tree in 1908, and in 1973 specified that the state tree is the white oak (*Q. alba*). Maryland recognized the white oak as its state tree in 1941. The official arms of the state of Connecticut bears clusters of white oak (*Q. alba*) leaves and acorns (the official state tree, “the charter oak,” does not specify a species). The oak (*Quercus*, no particular species) was designated the state tree of Iowa in 1961 (many authors have erroneously listed bur oak, white oak, or northern red oak as the state tree of Iowa). The seal of West Virginia contains a wreath of bay laurel and oak leaves, emblematic of valour (bay) and strength (oak). The District of Columbia declared the scarlet oak (*Q. coccinea*) to be its official tree in 1960. The red oak was adopted as the state tree of New Jersey in 1950, although in 1951 the American dogwood (*Cornus florida*) became the “state memorial tree.”

APPEARANCE

Red oak is considered to be the tallest and most rapidly growing of the North American oaks. It often reaches 20-30 m (66-98 feet) in height, and 60-90 cm (2-3 feet) in diameter. In the US, trees that are 49 m (160 feet) high and 3 m (10 feet) in diameter have been recorded. In closed forests, the red oak grows straight and tall, often columnar in outline, clear of large lower branches but with scraggly small branches persisting for years on the lower trunk before being shed. In the open, the tree becomes shorter, with a stouter trunk, and develops a broad, roundish-topped, more spreading crown. The trees often develop a taproot and a network of spreading lateral roots. The mature leaves are 12-20 cm (5-8 inches) long. The leaves tend to remain on the trees, into late autumn and early winter. The bark is gray to grayish-brown, with shallow vertical furrows and low ridges,

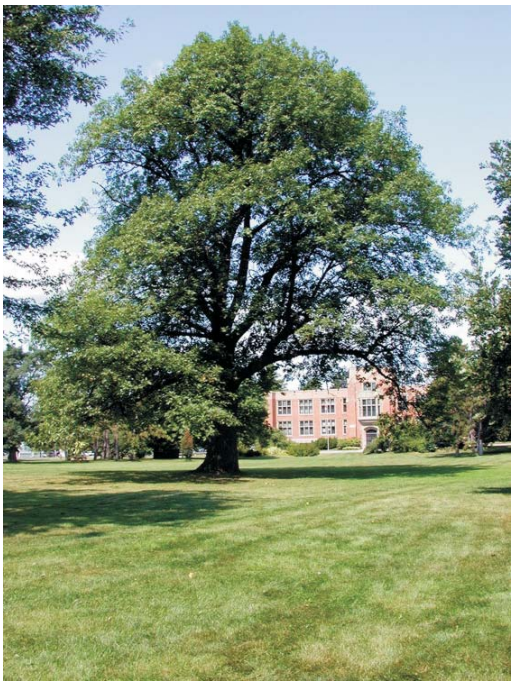


Fig. 11. This red oak was planted by His Royal Highness the Duke of Connaught, Governor General of Canada on October 18th, 1911. The 100-year old tree frames the Saunders Building on the Central Experimental Farm In Ottawa. This building and its facilities, including the largest research collection of dried plants and the largest botanical research library in Canada, provide the essential resources for this series. Photo by P.M. Catling in 2007

ridges tending to become checkered with age. The ridges of younger bark may appear to have stripes down the trunk or branch (several other oaks have such bark).



Fig. 12. Bark of red oak trees of different ages. Photos by P.M. Catling.

The remaining base of trees that have been cut down frequently develop sprouts (also known as suckers), and a single stump can produce several new trunks (a phenomenon called “coppice growth”). Indeed, sprouting seems to be an important kind of reproductive insurance in

red oak. After fires and other kinds of injury, basal sprouts are often developed.

Clusters (drooping, yellowish catkins) of male flowers are produced in the leaf axils of the previous year's growth. The female catkins are produced on small flowering branches in the axils of the current year's growth. Acorns are developed singly or in cluster of up to five. They are 12-25 mm (0.5-1 inch) long (rarely as long as 35 mm or 1.4 inch), with a shallow, saucer-shaped cup, and contain a large, white, bitter kernel.



Fig. 13. Flowering branch of red oak, with hanging catkins of male flowers and short spikes of young female flowers. Source: Sargent, C.S. 1895. The silva of North America. Houghton, Mifflin and Company, Boston, MA. Vol. 8, plate 409.



Fig. 14. Red oak leaf, branch with acorns, and extracted seed. Source: same as Fig. 13; plate 410.



Fig. 15. Red oak leaves. Photo by P.M. Catling.



Fig. 16. Red oak branch with acorns. Photo by P.M.Catling.

CLASSIFICATION

Family: Fagaceae (beech family).

There are about 400 species of *Quercus*, which are native to all continents except Australia. Most are indigenous to the temperate regions of the Northern Hemisphere, and to high altitudes in the tropics. Acorns, the scaly-cupped fruits (commonly called “nuts”) of oak trees, have provided nourishment for people since prehistory. Ninety species are native to North America north of Mexico, and 12 of

these are in Canada. (Three foreign species are commonly planted.) Most of Canada's native oaks are found in eastern Canada. Bur oak (*Q. macrocarpa*) ranges into the prairie provinces and Garry oak (*Q. garryana*) is found in British Columbia.

There are two groups of oaks in North America, the “white oaks” and the “red or black oaks.” The white oaks have leaves with rounded lobes. The seed is relatively sweet. The red oaks have leaves mostly with pointed and bristle-tipped lobes. The red oak group includes the live oaks of the US and Mexico, also known as the evergreen oaks. Most species of the red oak group have acorns that are edible but are extremely bitter, except for the live oaks, which tend to bear relatively sweet acorns. Red oak species can be difficult to identify.

Quercus rubra trees with large nuts that are only 1/4th covered by flat, saucer-shaped cups are sometimes treated as var. *rubra*, while those with smaller nuts 1/3 covered by cup- or bowl-shaped cups have been recognized as var. *borealis* (Michx. f.) Farw., sometimes called gray oak or northern red oak. Many of Canadian plants are referable to the latter variety. *Quercus rubra* var. *rubra* is sometimes called southern red oak, but this name is usually applied to *Q. falcata* (also known as Spanish oak).
Red oak hybridizes with many other oak species.

GEOGRAPHY

Red oak is indigenous to eastern North America. In Canada, it is native to Prince Edward Island, Nova Scotia, Quebec, and Ontario. It has become naturalized at Revelstoke, British Columbia. In the US, it has been collected from 40 States, and local populations are found as far south as Louisiana and Mississippi. Red oak is common in the following eastern Canadian forest regions: Deciduous Forest, Great Lakes St. Lawrence Forest, Acadian Forest.

During the last major North American glaciation, 10,000 years ago, many hardwood species were pushed far to the south. Red oak, however, occurred in the cool meadows and spruce forests close to the edge of the glacier.

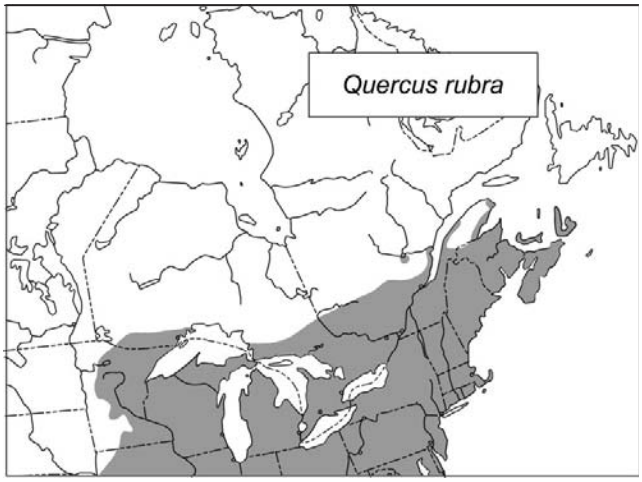


Fig. 17. Canadian distribution of red oak.

KEY TO THE RED OAK GROUP IN CANADA

1a. Leaf stalk 10-25 mm long; leaves densely hairy below.....*Q. ilicifolia* (bear oak; southern Ont.)
1b. Leaf stalk 20-70 mm long; leaves smooth or with tufts of hair where major veins diverge or with scattered hair.....2

2a. Terminal buds pubescent throughout.....*Q. velutina* (black oak; southern Ont)
2b. Terminal buds smooth or pubescent only in the upper half..... 3

3a. Terminal buds hairy on all of upper half..... 4
3b. Terminal buds essentially smooth..... 6

4a. Leaf blade dull green or glossy green; leaf sinuses extending to less than 1/3 distance to midrib: leaf lobes not expanded outwardly.....*Q. rubra*
4b. Leaf blade glossy green; leaf sinuses extending to more than 1/2 distance to midrib: leaf lobes expanded outwardly.....5

5a. Acorn scales with a broad glossy base and strongly concave margins; acorn with one or more concentric rings of pits at the apex.....*Q. coccinea* (scarlet oak; only planted)
5a. Acorn scales hairy and with straight or slightly concave margins; acorn lacking rings of pits at the apex.....*Q. ellipsoidalis* (northern pin oak; southern Ont.)

6a. Twigs reddish-brown; acorn cup thin, 3-6 mm high..... *Q. palustris* (pin oak; southern Ont.)
6b. Twigs gray to light brown; acorn cup thick, 7-12 mm high.....*Q. shumardii* (Shumard oak; southern Ont.)

ECOLOGY

Red oak is a dominant species in some locations, and often the trees are more or less even-aged. The seedlings are unable to reproduce in the shade of a climax red oak forest, and the species is often replaced successionally by more shade-tolerant species such as sugar maple and American basswood. “Northern red oak is neither an aggressive colonizer that is characteristic of early successional species nor an enduring, shade-tolerant, slow-grower that is typical of late successional species. Its regeneration requires an edge environment: one that is more mesic than exposed, open sites, but less competitive than the deep shade of a forest understory” (Crow 1988). In historical times, red oak forests were promoted by relatively frequent disturbances, such as fire and windstorms. During European settlement, timber harvest and man-made fires favoured the growth of red oak, which reproduces quickly both from acorns and stump sprouts. The result was that in recent centuries stands of red oak were greater than they are today. Many researchers believe that because recurrent fires are a key to oak dominance, the suppression of fire in eastern North America has led to the decline of oak and the increase in maple.

Habitat

This species grows on a variety of dry to moderately moist sites, often on sloping land. It occurs on a range of soil textures, including gravelly soils, sand, loam, and clay. The best growth is on deep, fertile, slightly acidic, well-drained soils with a high water table. Red oak is intermediate in shade tolerance.

Inter-species Relationships

White-tailed deer browse on the leaves and, less commonly, so do elk, hares, cottontail rabbits, and moose. The acorns are consumed by a variety of small mammals including mice, chipmunks, and squirrels. Larger mammals that eat the acorns include fox, racoon, red-tailed deer, and black bear. Numerous birds, especially bluejays, feed on the acorns. The extinct passenger pigeon depended heavily on acorns. They are a particularly important food for wild turkeys. A single wild turkey can consume over 200 at a meal. Gypsy moths and many other insects feed on red oak, but only occasionally cause serious harm. Red oak acorns have 20 times the concentration of tannic acid compared to white oak (*Q. alba*), and this is thought to provide protection against some insects. One of the most conspicuous results of insects on red oak is the development of large circular leaf galls, often called “oak apples.” Typically, 80 to 100% of the crop is eaten by animals and, in poor acorn years, virtually every acorn is consumed. However, in good acorn years thousands of acorns per hectare can survive.

Good crops of acorns occur once every 2-5 years. Following years of heavy nut production, black bear reproduction often increases. On the other hand, it has been reported that in years of light nut production, the bears cause increased damage to crops, livestock, and beehives.

In the eastern US, years in which acorns are abundant appear to reduce the harvest of white-tailed deer in forested areas. Why? The deer gorge on acorns in the autumn and, when acorns are relatively scarce, the animals flock to the limited number of trees with good production. Knowledgeable hunters stake out such trees, making it easier to kill their prey. However, in years of acorn abundance it is harder to predict where the deer will congregate.

In addition to providing food, red oak furnishes cover and/or habitat for a wide variety of birds and mammals. Birds in particular use the trees as perching and nesting sites, and also use the twigs and leaves as nesting material.

A condition known as “oak decline” affects red oaks in particular. It is apparently due to a combination of conditions (such as air pollution, drought, frost, defoliation, and pathogens) that cause progressive dieback from the top down and outside in. It has damaged many trees in the central Appalachian region.

Pollination & Dispersal

Red oak reproduction occurs mostly by acorns, and these are distributed by animals. The nuts can remain viable for 2 or 3 years, but most successful germination occurs in the spring following the season of production. Buried nuts are much more successful than nuts that remain on the surface of the soil; one reason for this is that exposed nuts are very vulnerable to rodents. “Scatter-hoarder” animals, notably the gray squirrel, are very important for seed dispersal. Gray squirrels are known to bury as much as 20% of the crop, and to fail to retrieve many of the acorns, leaving them to germinate. Gray squirrels have been observed to bury many seeds just a few meters from the tree; mice and chipmunks to move acorns 10-30 m (33-100 feet) away; and blue jays to transport the seeds from several hundred meters to 5 km (i.e. up to about 3 miles).



Fig. 18. Red oak. Source: Loudon, J.C. 1844. The trees and shrubs of Britain. Longman, Brown, Green, and Longmans, London, U.K. vol. 8.

USES

Except for the softwood (coniferous) species, oaks furnish more timber annually than any other group of trees in North America. Red oak is an important source of hardwood lumber, used for furniture, cabinets, panelling, flooring, and caskets. Red oak is cheaper than white oak, and so is preferred for flooring and for cheaper grades of cabinets and furniture. In the past, when hardwood was available in greater supply, red oak was also used for railroad ties, fenceposts, and firewood. In the US, the species has been used to rehabilitate coal mine spoils. Red oak is a popular ornamental shade tree in eastern North America, as well as in Europe and Australia.

North American Indians removed the bitter tannins from acorns by using several techniques, and employed the nuts in a variety of food preparations. The dependence on acorns was so great that in some places a person would eat a ton of acorn flour yearly. Acorns were so important that some Indian calendars were based on the acorn harvest date. Such calendars indicated how far away or how much time has passed from the acorn harvest season. Native people also used red oak bark as a source of medicines, especially for digestive disorders, respiratory diseases, and skin infections. The Wintu Indians of California used to mix acorn flour with water and let it mould. The mould was used as a medicine much like penicillin. The bark was also once used as a source of yellowish, brownish, and reddish dyes, and for extracting tannins for hide preparation.

In early times, oak trees were very widespread, and acorns were an extensively consumed food throughout the world. Today, acorns are gathered occasionally for personal use, and are very rarely encountered in trade for food purposes. Acorns do not suit the taste of many people, although some of the sweeter species have been compared to chestnuts. Although acorns are rarely found in commerce, and are an uncommon food for humans, they are still often eaten by people in southern Europe, and are very widely used as mast (i.e. nuts accumulated on forest floors) to feed hogs. (There are reports that cattle have been poisoned by eating acorns.) Although not cultivated for nuts, acorns constitute an annual crop that exceeds all other nuts put together.

The bitter chemicals in acorns, called tannins, are water soluble and can be leached away to produce a sweeter, nut-flavoured product. An old European method of leaching the bitter tannins out of the acorns was to place them in a cloth bag in a stream. Still another traditional method was to bury the acorns in boggy ground overwinter. The following provides a home method for preparing acorns. As noted above, relatively sweet acorns can be collected from the white oak group, while species of the red oak group should be avoided. Place acorns in a pot of water, and discard any that float. Boil them for about 15 minutes. Shell the acorns, crunch them up and boil them again. When the water turns brown, pour it off and boil again, repeating until the water doesn't turn brown. This works best if the nuts are crushed into quite small pieces, and to avoid losing pieces, they can be boiled in cheese cloth. If the water is clear but still tastes bitter, boil them until they are not bitter. Dry the material in an oven. They can be eaten this way and also used as a replacement for nuts in recipes. The flour can be used in baked foods, but not alone in breads, since it lacks gluten.

“Acorn coffee” was once widely consumed in Germany, and to a lesser extent in England during World War I. Ripe acorns were cut into pieces, dried in an oven, roasted, and ground, a little butter was added to the powder, and it was used in the same way as regular coffee. Acorns of the white oak were used as an inferior coffee substitute during the American Civil War, when blockades and wartime conditions in general made coffee scarce.

Oak leaves are very rich in tannins. Tannins were originally used in tanning leather, because they coagulate and toughen proteins, especially those in skin. Tannins can be used in pickling to assist in firming vegetables and, in Poland, oak leaves have commonly been used for this purpose.

CULTIVATION

The red oak is an excellent, large shade tree that can withstand the pollution of cities. It also is suited to the cold temperatures of Canada, and is grown as far north as Edmonton. It does best in full sun and moist, slightly acidic, well-drained, rich deep soil. Establishing plants from acorns is not as easy as it might seem (acorns may not be viable for various reasons, and they need to be stored properly), but the tree is relatively easy to transplant, and so homeowners can simply purchase a small, potted plant from a nursery. The main drawback is that the tree grows too large for most city lots. Extensive information on how to collect, store, and evaluate acorns, establish the plant from these, and how to cultivate nursery stock is found in Dey and Buchanan (1995), cited below.

CONSERVATION STATUS

Red oak was one of the dominant trees of the original mixed-wood forest (part of the Acadian Forest) of Prince Edward Island. The Acadian Forest dominated the Maritime region until the 18th century, and by the end of the 19th century 80% of P.E.I.'s land was cleared for settlements. As a result of conversion of the land for agriculture (especially potatoes), forest harvesting, road building, and urbanization, only fragments of the original ecosystem remain in the province.

Forty-five percent of P.E.I. is still forested, but much of this is white spruce, which has done well following clearcutting. Unlike the rest of Canada, where government and industry manage and/or own the forests, in P.E.I. almost 90% of the forested area is in the form of thousands of small, privately owned woodlots. Rather than cutting selectively, which would promote a return to the original forest, many landowners prefer to use their property to establish relatively profitable (at least in the short term) conifer plantations. This so-called “cut-and-run” management policy is increasingly being viewed as incompatible with society's growing concern for the welfare of the planet. Given the present situation, it might seem hopeless that a meaningful resurrection of the Acadian Forest could be achieved, but this is the aim of a coalition of P.E.I. environmentalists (note the following text box).

Restoring the Biodiversity of P.E.I.

"We have a real opportunity to restore the native Acadian forest. True, this will take time, but it will also be an effort that brings great reward. we can continue the large-scale degradation that has taken place since Europeans first set foot on this Island. Or we can create healthy, diverse forest systems that provide a huge array of products, and also serve many other valuable roles cleaning air, purifying water, protecting streams, storing carbon, housing wildlife and providing places for recreation."

Gary Schneider, in "Restoring biodiversity" (http://www.elements.nb.ca/Theme/invasive_species/gary/schneider.htm)



Fig. 19. Red oak wood grain is so open that smoke can be blown through it from end-grain to end-grain on a flatsawn board (i.e., with growth rings approximately parallel to the wide face of the board; a quartersawn board has the annual growth rings approximately perpendicular to the surface of the board's wide face). Alternatively, the porosity of red oak can be demonstrated by dipping one end of a twig in soapy water and blowing on the other end; bubbles will be produced. White oak, by contrast, has relatively closed vessels so that the wood is waterproof, and can be used for whiskey barrels and outdoor furniture. Figure drawn by B. Brookes

MYTHS, LEGENDS, TALES, FOLKLORE, AND INTERESTING FACTS

- People today will find it difficult to fathom, but oak worship was widespread in the Middle Ages in Europe, sometimes by devout Christians. Orthodox Christians in Russia worshipped a holy oak until the 1870s, fixing candles to its trunk and branches and praying to it. The famous heroine of France, Joan of Arc (1412-1431), was accused of worshipping a bewitched oak.
- Perpetual oak fires in homage to oaks were well known. In Rome, the Vestal Virgins used oak for their perpetual fire. A perpetual fire of oak wood was kept burning at Novgorod (north of Moscow, Russia), and the death penalty was imposed for allowing the fire to go out.
- According to an old practice, If lovers put two acorns, representing themselves, in a bowl of water and they float towards each other then they will marry, but if they drift apart, so will they.
- In Roman times the oak symbolized bravery, and a crown of oak leaves often rewarded military or civic achievements. In the US military, the Oak Leaf Cluster is awarded as an additional honour to those who have already been decorated for exceptional service.
- England ruled the seas in part because of its large oak forests that were used to build the finest warships. About 3,500 oaks or 364 ha (900 acres) of oak forest were needed to supply the timber required for a large battleship.
- Large red oak trees can produce over 4000 acorns in one season.
- Poison oak is not an "oak" (nor is poison ivy an "ivy').

OAK HUMOUR

How do you get an elephant to the top of an oak tree? Stand him on top of an acorn and wait 50 years.

How do you get an elephant down from an oak tree? Tell him to sit on a leaf and wait until autumn.



Fig. 20. Red oak. Source: International Wood Collectors Society. 2000. Canada's arboreal emblems. An overview of Canada's official trees and their wood. Reproduced with permission of C. Holder (author) and J. Monty (president) of the Canada Tree Foundation

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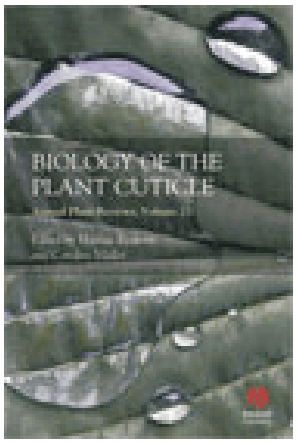
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Book Reviews.



Biology of the Plant Cuticle. *Edited by Markus Riederer and Caroline Müller. 2006. Blackwell publishing ISBN: 1-4051-3268-X*

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The plant cuticle is the interface between the plant and its environment. Thus, its biological properties must reflect the important roles it plays in both biotic and abiotic interactions. Composed of both waxes and cutin, a bio-polyester the structure of which is still unknown, this multi-functional hydrophobic layer is the focus of intense research. This book represents a thorough and comprehensive review of this research covering every aspect of the biology of this important surface, the first of its kind in many years. However, significant progress has been made in this field in recent years making the publication of this volume very timely.

The introductory chapter provides a logical and succinct overview of the essential functions of the cuticle, which themselves serve as introductions to the subsequent chapters. Not only serving as an overview of the book itself, it also provides an extensive literature review of every function that has been attributed to the cuticle briefly describing the supporting evidence that demonstrates the properties of the cuticle with respect to these functions.

Chapter two, nearly a book on its own, is a detailed analysis of the cuticle from the perspective of ultra microscopy technique. A careful review of the literature with descriptive figures and excellent micrographs provides the reader with an in depth analysis of the ontogeny and developmental aspects of the cuticle. In addition, the author provides extensive descriptions of the different structural kinds of cuticles that have been described as well as the distribution of these types within plants and plant organs. A similar extensive review of the morphology and distribution amongst plants of epicuticular wax types is also in this chapter. In short, this is perhaps the most extensive literature review of the ultrastructure of plant cuticles ever published. As a reference, it is invaluable as it will serve as a comparative index of cuticle structures from a staggering number of plants.

Cutin is a polyester, made up of monomers derived from C16 and C18 fatty acids. However, like many plant polymers such as lignin, the three dimensional structure of the assembled polymer is still a mystery. Chapter three is a succinct description of what is known about the properties and structure of the cutin biopolymer matrix. This chapter describes analytical techniques in polymer chemistry that are not familiar to the typical plant biologist, nevertheless, even a casual read provides an interesting overview of this fascinating polymer matrix. It is important to mention here that the authors do not lose sight of the biological relevance of the physico-chemical properties that have been described using advanced techniques such as solid state NMR. For example, the elasticity of tomato fruit cuticles important to prevent fruit cracking, which for agriculture is a costly disorder in tomato crops.

Chapters four and five provide a careful review of the composition and biosynthesis of cuticular waxes, respectively. With a special emphasis on the experimental approaches used to determine these compositions, chapter four provides the reader not only with a very useful review of available methodologies, but also an extensive and critical examination of the current literature describing the composition of waxes in plants studied to date. The biosynthetic pathways responsible for the waxes are described in the subsequent chapter providing an extensive and up-to-date review of the genes and enzymes involved in these pathways. As well, a thoughtful discussion on the little-understood secretion and transport of the waxes from the presumed site of biosynthesis to the plant surface is also provided. *(Continued overeaf)*

The optical properties of the plant surface are potentially important to the plant with respect to UV radiation. Chapter six describes the current methods available for studying surface optics with special reference to the plant cuticle.

Chapters seven and eight describe the cuticle respect to its permeability to both lipophyllic and polar compounds. The issue of transport across the cuticle is relevant to not only fundamental biological questions such as the release of defensive plant secondary metabolites, but also agricultural applications such as herbicide efficacy. These chapters provide an introduction to the approaches used by researchers in this field as well as useful literature reviews.

The main physiological function of the cuticle is the prevention of water loss; the transpiration of water through the cuticle is the focus of chapter nine. Much of the literature describing the permeability of plant cuticles to water requires a good understanding of the theory that addresses the transport of water through a membrane. This chapter provides an explanation of these models and the application of them in describing the environmental effects on water transpiration through plant cuticles and the significance of stomatal closure with respect to water loss.

In addition to its role in water relations, the cuticle is also important in post-embryonic development, being required for the prevention of organ fusion. The biological significance of the phenotypes of known cuticle mutants is discuss in Chapter 10. Special emphasisis is made on the model plant *Arabidopsis thaliana*, where much of the recent advances in this area have been made.

The role of the cuticle in the interactions between plants and microorganisms and insects is the focus of the last three chapters. Like the previous chapters, clear explanations of the methodologies, and their respective pros and cons, are provided in addition to a review of the state of knowledge in these fields.

Biology of the Plant Cuticle is not only comprehensive in its content, but also the chapters are well integrated. Individual chapters do not stand alone, but refer to the other chapters where relevant. Moreover, an extensive index is provided as well. I would strongly recommend this text as an authoritative reference for anyone interested in this aspect of plant biology.

Plant Proteomics, *Edited by Christine Finnie, Annual Plant Reviews Volume 28, 2006, Blackwell Publishing.*

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The book 'Plant Proteomics' is volume 28 of an annual Plant review series by Blackwell Publishing. This volume, edited by C. Finnie (Technical University of Denmark), has nine chapters and the stated aim in the preface is “to highlight ways in which proteome analysis has been used to probe the complexities of plant biochemistry and physiology”. An overview of plant proteomics is given in the first chapter (by Heazlewood and Millar), followed by an excellent, detailed and up-to date chapter on post-translational modifications in plant proteomes (Gruhler and E. N. Jensen). Many practical details are provided e.g. on phosphopeptide identification. Chapter 3 summaries protein-protein interaction studies discussing both protein based techniques (e.g. native gel electrophoresis), DNA based techniques (e.g. yeast hybrid systems) and fluorescence based techniques (BiFC and FRET). The important topic of monitoring the redox state of plant proteomes, with emphasis on cystein based modifications is discussed in Chapter 4 by B. Svensson and colleagues. The chapter includes a very useful and exhaustive list of thiol-reactive reagents with their references. Chapter 5 discusses large scale approaches in plant structural proteomics by members of the Center for Eukaryotic Structural Genomics (CESG) at the University of Wisconsin-Madison. The chapter provides a welcome update on the successes and bottlenecks of large scale protein overexpression and purification systems (including *E. coli* overexpression, wheat germ cell-free protein production), as well a structure determination by X-ray crystallography and NMR. A list of *Arabidopsis* protein structures solved by the CESG (upto Oct 2005) is provided. While the title of Chapter 6 is 'cereal proteomics' (by S. Momatsu), the emphasis of this chapter is very much on rice proteomics (mostly using 2D gel approaches), with little mention of work on e.g. maize and barley. Chapter 7 describes in great detail proteome analysis of developmental processes, with a strong focus on seed ripening and germination. This chapter provides an exhaustive overview and references in seed proteomics (of *Arabidopsis* and *Medicago*) and is written by members of the Job lab (L. Rajjou, K. Gallardo, C. Job and D. Job). 8 discusses the topic of plant cell wall proteomics (by JKC Rose and colleagues) and includes a detailed table of plant cell wall (including the apoplast) projects, with their respective techniques, pitfalls and references. The topic of the final chapter is mitochondrial proteomics (NV Bykova and IM Moller) providing a useful set of references and overview of mitochondrial protein identification and responses of the mitochondrial proteome to various stress conditions (oxidative stress, anoxia, etc.)

Given the rapid development of mass spectrometry based techniques and the abundance (proliferation) of reviews regarding plant proteomics published in various journals, one can wonder about the value and life-time of bundled reviews in hardcopy books as the one discussed here. The advantage of such books is to have the reviews bundled together. In the case of this volume 28, the content of in particular chapters 2, 5 and 7 seem novel and updated and not well covered by existing reviews. The book also carries a useful and elaborate keyword index, which may provide a good starting point for those less familiar with the history and recent developments in plant proteomics.

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